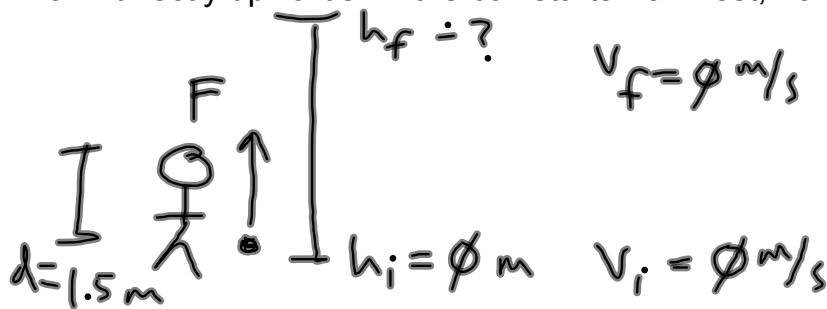


Exam Review 5.17.12 Honors Physics

A person throws a baseball with mass of .115 kg with a force of 60 N over a distance of 1.5 m directly upwards. If the ball starts from rest, how high does it go?



$$W = \Delta E$$

$$F d \cos \theta = \frac{1}{2} m (v_f^2 - v_i^2) + m a_g (h_f - h_i)$$

$$F d = m a_g h_f$$

$$\begin{aligned} h_f &= \frac{F d}{m a_g} \\ &= \frac{(60 \text{ N})(1.5 \text{ m})}{(.115 \text{ kg})(9.8 \text{ m/s}^2)} \\ &= 79.9 \text{ m} \end{aligned}$$

Exam Review 5.17.12 Honors Physics

A rock with a mass of 70 kg falls from a cliff that is 45 m high. What is the velocity just before the rock strikes the ground?

$$\{ h_i = 45 \text{ m} \quad v_i = 0 \text{ m/s}$$



$$- h_f = 0 \text{ m} \quad v_f = ?$$

$$E_i = E_f$$

$$\cancel{K_i} + U_{gi} = K_f + \cancel{U_{gf}}$$

$$\cancel{m} a g h_i = \frac{1}{2} \cancel{m} v_f^2$$

$$v_f = \sqrt{2 a g h_i}$$

$$= \sqrt{2(9.8 \text{ m/s}^2)(45 \text{ m})}$$

$$= 29.7 \text{ m/s}$$

A crane lifts a boulder that has a mass of 350 kg straight upwards with a constant velocity a distance of 12 m in 35 seconds. What power did the engine in the crane produce to accomplish this?



$$P = \frac{W}{t}$$

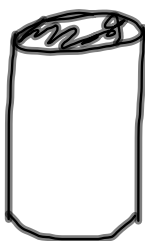
$$= \frac{F_s d \cos \theta}{t}$$

$$= \frac{m a_s d}{t}$$

$$= \frac{(350 \text{ kg})(9.8 \text{ m/s}^2)(12 \text{ m})}{35 \text{ s}}$$

$$= 1176 \text{ J}$$

An open/closed pipe has a fifth harmonic standing wave present in it. If the speed of sound is 340 m/s and the frequency is 578 Hz, what is the length of the pipe?



only odd harmonics

$$f_n = \frac{nv}{4L}$$

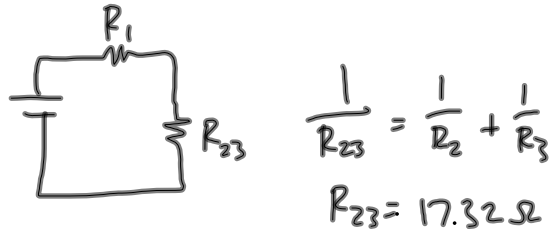
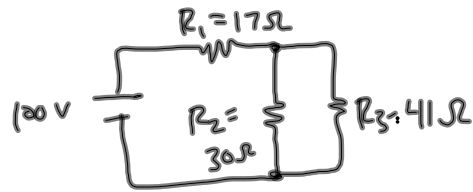
$$L = \frac{nv}{4f_n}$$

$$= \frac{(5)(340 \text{ m/s})}{4(578 \text{ Hz})}$$

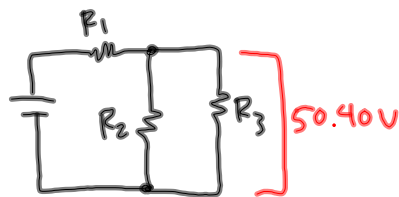
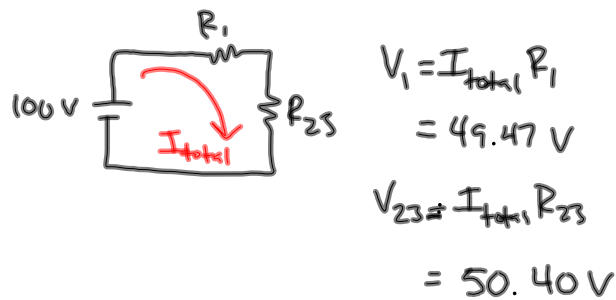
$$= 0.735 \text{ m}$$

Exam Review 5.17.12 Honors Physics

find all V's and I's:



$$I_{total} = \frac{V_{battery}}{R_{eq}} = \frac{100V}{34.32\Omega} = 2.91A$$



$$I_2 = \frac{V_{23}}{R_2} = \frac{50.40V}{30\Omega} = 1.68A$$

$$I_3 = \frac{V_{23}}{R_3} = \frac{50.40V}{41\Omega} = 1.23A$$

$$V_1 = 49.47V \quad I_1 = 2.91A$$

$$V_2 = 50.40V \quad I_2 = 1.68A$$

$$V_3 = 50.40V \quad I_3 = 1.23A$$